

Net Bias and the Treatment of “Mission-Critical” Bits

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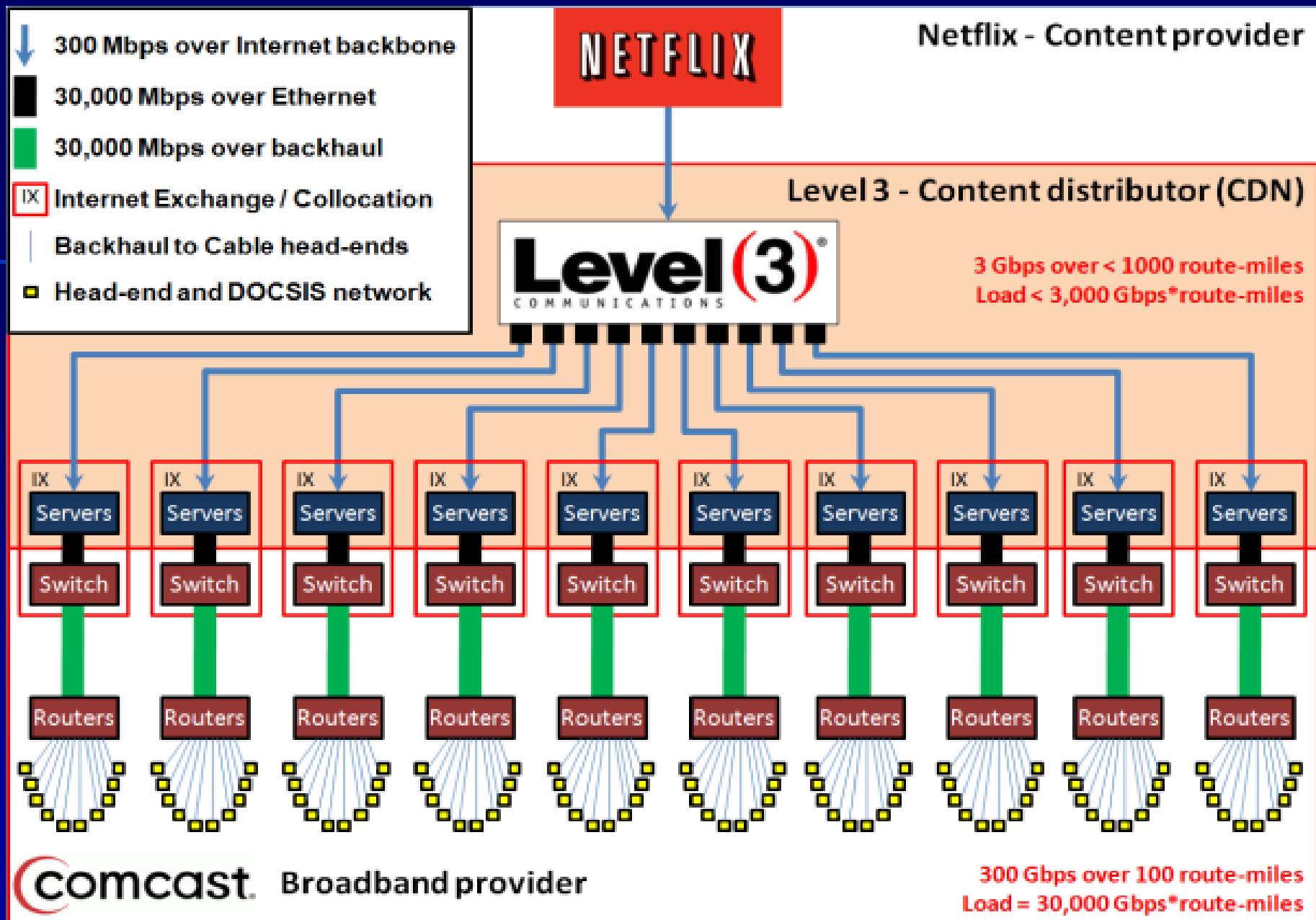
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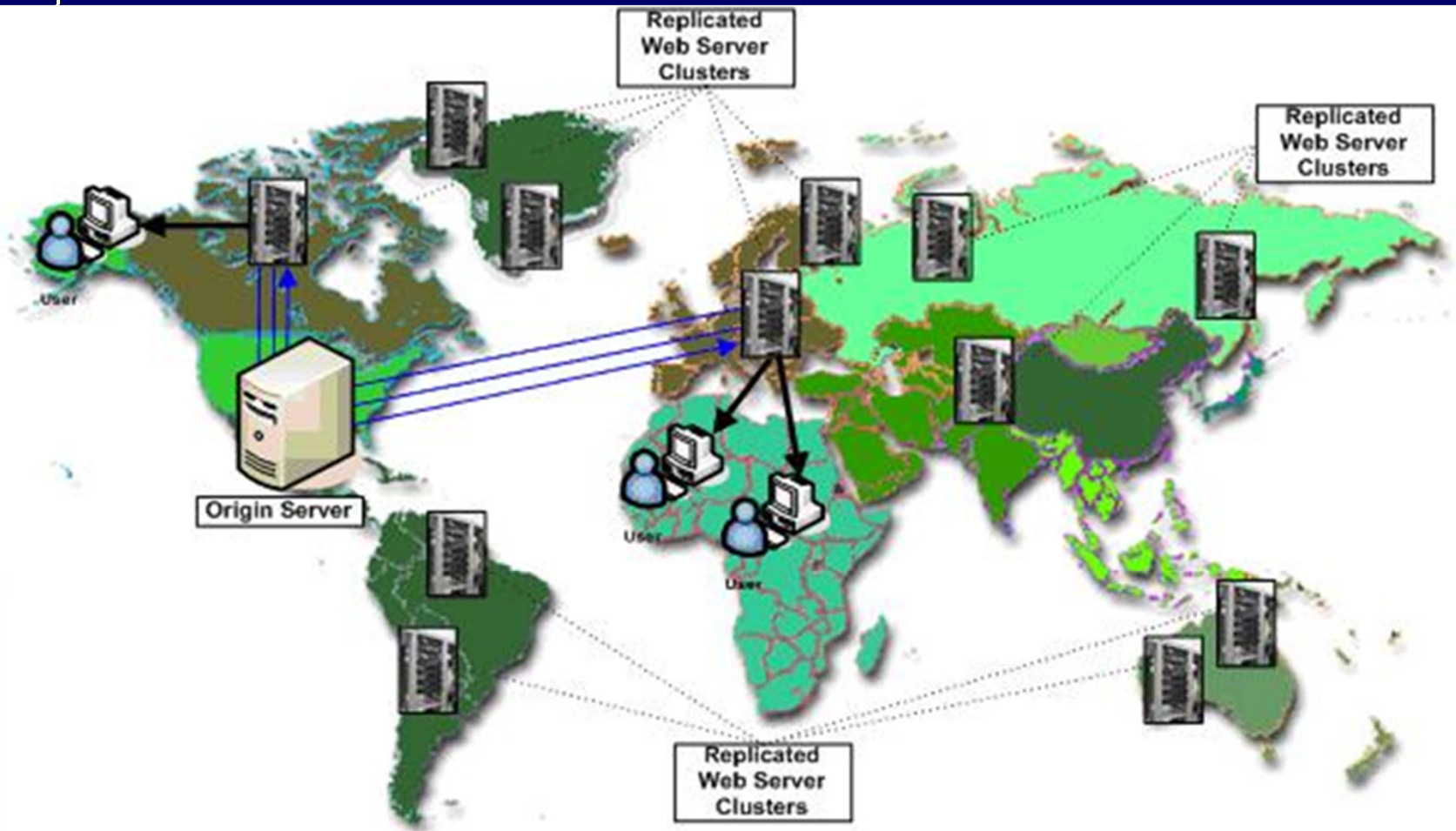
The Internet Ecosystem

- Consider the Internet as the product of seamless interconnection between servers, routers and broadband subscribers using the telecommunications transmission networks of many, often-unaffiliated operators.
- We should concentrate on the interconnection between various operators that go by several different names: Internet Service Provider (Tier-1, Tier-2, retail) Content Distribution Network, Peer, Paid Peer, Transit Lessee, etc.





Providing Better Than Best Efforts Content Delivery via Proxy Servers Does Not Violate Open Internet Policy



Consumers Want Conduit Neutrality Except When They Do Not

- Most consumers favor Internet Service Provider (“ISP”) neutrality and the application of “best efforts” routing protocols. In the absence of congestion, the status quo provides a level competitive playing field between content providers and distributors in terms of “access to eyeballs.”
- New bandwidth intensive applications, such as Internet Protocol Television (“IPTV”) and Over the Top Television (“OTT”) increase the probability of congestion and degradation of service quality, even in the absence of deliberate efforts by an ISP to “throttle” bandwidth hogging subscribers or to disadvantage competitors.
- IPTV consumers have a quick pain threshold for Quality of Service (“QOS”) degradation; full motion video cannot become a slide show, or lose packets.
- IPTV consumers welcome QOS enhancements, including ones that offer “better than best efforts” prioritization of “mission critical” bitstreams, e.g., “live” programming such as sporting events and award telecasts.
- Companies, such as Akamai, Limelight Networks and Level 3, have generated no controversy when they enhance traffic delivery from the Internet cloud to the “retail” ISP for final delivery.

ISPs Want to Offer Paid Prioritization, But Doing So Risks Many of the Benefits From Neutrality

- ISPs' largely unregulated status promotes innovative ways to accommodate mission critical bits, but QOS and price discrimination can become a readily available way to favor corporate affiliates and ventures willing and able to pay surcharges.
- Retail ISPs operate an exclusive "last mile" conduit, because consumers typically chose only one carrier to provide all access to and from the Internet cloud.
- Last mile access competition remains limited: 1 DSL carrier, 1 cable modem carrier. Satellite options are slower, more expensive and have latency (signal delay) challenges. Fourth Generation terrestrial wireless offers a more expensive and still comparatively slower option; consider the impact of a 5-10 Gigabyte monthly wireless allowance vs. and "unlimited" or 250 Gigabyte wireline allowance.
- Opponents of paid prioritization expect ISPs to nudge or push content and application providers to better than best efforts service tiers by guaranteeing QOS problems with standard service.
- ISPs can target individual ventures and bitstreams for congestion and consumers may not whom to blame.

Interconnection and Compensation Models Have to Adapt to New Demands and Changed Circumstances

Until its privatization and commercialization, the Internet carriers typically used a zero charge, “peering” process that assumed a “rough justice” balance of traffic; even if traffic flows weren’t equal, governments rather than the carriers usually paid.

Carriers operating in the now fully commercialized Internet pay close attention to traffic flows and now limit peering (barter) to equals in terms of bandwidth capacity, locations served, subscriber population, etc. Smaller ISPs now pay for “transit.”

Substantial increase in downstream traffic handed off to retail ISPs have forced adjustments, because both the peering and transiting options will not work particularly for IPTV/OTT, new peak demand triggered by a small number of companies such as Netflix and YouTube, release of a complete season of “must see” television episodes, instead of sequential release, end user demand for access anytime, anywhere, via any device and in any presentation format; the end of “appointment television” with content delivery to at least 4 different screens (TV, PC, smartphone and tablet).

New types of ISPs have entered the marketplace including Content Distribution Network with lots of traffic to deliver downstream, and possibly less capacity to handle upstream traffic.

More Likelihood for Traffic Imbalances and Compensation Disputes

- Retail ISPs no longer will simply accommodate ever increasing downloading volumes. They have imposed rate increases on both sides of their market: downstream by tiering retail service based on bit delivery speeds and monthly downloading allotments and by targeting upstream ISPs and even content sources for surcharges.
- Some economists have tried to prove that when operating in a double-sided market a venture cannot extract two monopoly rents without harming profitability, but it remains unclear whether ISPs are so constrained.
- New remedies to compensation disputes include use of Internet Exchange Points by Tier-2 ISPs, paid peering (Comcast-Netflix), CDN surcharges (Level 3-Comcast), equipment co-location, e.g., Netflix Open Connect Network; “specialized networks” and Intranets/ Multiprotocol Label Switching and non-carriers like Google securing Autonomous System identifiers.
- Unclear whether a startup venture with a tiny fraction of Netflix’s traffic volume can still qualify for “plain vanilla” best efforts routing.

Netflix-Comcast

Once an advocate for network neutrality, Netflix has opted for higher QOS through a paid peering arrangement with Comcast. Netflix directly interconnects with Comcast at many locations thereby reducing the number of networks and routers typically used. Virtually overnight Netflix traffic congestion problems evaporated thanks to lower latency and faster delivery speeds.

Paid peering provides “Most Favored Nation” treatment of specific traffic streams has triggered a vicious debate over what constitutes reasonable price and QOS discrimination.

Netflix’s payments to Comcast are offset in part by reduced or eliminated payments to CDNs, but the accrual of more revenues for retail ISPs raises concerns about rising bottleneck/last mile control.

Will surcharge demands and better than best efforts become the new normal even for venture with modest traffic volumes previously accommodated without problems using the best efforts standard?

Lessons From Television Retransmission Disputes

Television broadcasters and cable television operators negotiate for the latter's right to deliver programming to subscribers. Broadcasters can secure mandatory carriage ("must carry") at zero cost to cable operators; otherwise payments flow from cable operator to broadcaster for retransmission consent.

Compensation has skyrocketed from \$28 million in 2005 to \$2.4 billion in 2012, a nearly 8,600 percent increase in seven years. The total is expect to more than double to \$6.05 billion by 2018 amounting to about 23% of total TV station revenue.

With increasing frequency retransmission negotiations do not reach closure before a cable or DBS operator has to stop carrying specific channels. Consumer pain tolerance grows acute over days or weeks as opposed to minutes for broadband.

For added leverage in negotiations the Fox and CBS networks identified cable television subscribers seeking access to blocked content available via the Hulu and CBS web sites. Fox denied Cablevision subscribers access and instead sent this message:

We notice that you are attempting to access Fox content on Hulu. Unfortunately this content is currently unavailable to Cablevision customers.

We look forward to bringing Fox content to Cablevision customers again soon.

CBS and Fox show net bias opportunities can exist far upstream from the last mile.

Similarities and Differences

The Good News: Commercial negotiations can resolve most disputes with limited, if any harm to consumers and without regulator intervention. Netflix may have buyers remorse, but it negotiated for and received what it needed for itself and its subscribers. Cable operators capitulate at the start of the regular NFL season so subscribers do not miss truly “must see” television.

The Bad News: Broadband access has become a near essential. Any access dispute resulting in network balkanization or blockage can cause significant harm to consumers. Commercial negotiations typically end up in yet higher cable television and broadband subscription rates. If broadband has become a necessity, it regularly becomes more expensive, absent government-mandated subsidization.

In both instances the FCC lacks direct statutory authority to intervene, only to provide benchmarks for what constitutes “good faith” negotiation.

The FCC wisely refrains from interfering, but when should it do so? Consumers can survive if Comcast relegates an unaffiliated sport channel (covering tennis) to a more expensive and less viewed programming tier than an affiliated sport channel (covering golf).

The stakes and impact are much greater when a biased Internet favors certain types of content sources based of corporate affiliation, or ability to pay a surcharge.

Developing Trends

The FCC will continue to struggle in its quest to find a lawful way to impose ground rules on ISP interconnection and compensation arrangements. The Commission can impose transparency and reporting requirements, especially for better than best efforts, specialized arrangements. It also should establish use its complaint process to resolve disputes.

Chairman Wheeler wants an explicit FCC recognition of the paid prioritization option, but his Democratic Commissioners do not agree.

Consumers can expect to pay more for both content and delivery services, with more service tiers based on bit transmission speed and monthly downloading allotment. Expect a narrowing of the gap between permissible wired and wireless downloading. Also ISPs will “soften the blow” of stingy download caps with expanded opportunities for content and service providers to pay in lieu of metering the download (“sponsored data”).

ISPs have solidified their control over the Internet ecosystem, despite the conventional wisdom that content rules. When content demand triggers congestion, the content provider and its subscribers end up paying more.

ISPs will frame content prioritization as a necessary to manage a scarce resource, while opponents will accuse ISPs of creating scarcity and rationing a resource that previously managed to deliver content without surcharge or congestion.